**REMARKS/ARGUMENTS**

Claims 1-6 are currently pending in this application. Claims 5 and 6 have been canceled. The specification has been amended as required by the Office Action and 37 C.F.R. 1.75(d)(1) and MPEP § 608.01(o). New claims 7-10 have been added to further define Applicant's invention. Support for new claims 7-10 can be found in the original claims and on page 6 lines 15-20 of the originally filed application among other places. No new matter is added by these amendments. Entry of these amendments is hereby requested.

**Rejections Under 35 U.S.C. §112, First Paragraph.**

Claims 1-4 is rejected under 35 U.S.C. 112, first paragraph, for the reasons stated in the Office Action on page 2. Applicant respectfully traverses the rejections. Applicant has amended claims 1 and 2 to include the limitation of "wherein the start capacitor for only that speed is selected to minimize amperage spikes when switching speeds." Additionally, new claims 7-10 are limited to electrical circuitry that is configured to eliminate large amperage spikes when switching the electrical motor from a lower speed to a higher speed. The Office Action states that the "amended claimed subject matter was not described in the original written specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." Applicant believes that the specification clearly points out this amended claim language as shown on page 6, lines 3-20 of the originally filed application (emphasis added):

> In another preferred embodiment of the invention, the electrical motor 12 is a

application contains detailed support for the limitation of amended claims 1-2, "wherein the start capacitor for only that speed is selected to minimize amperage spikes when switching speeds." Moreover, new claims 7-9 also contain detailed support for the limitations claimed.

Applicant submits that the specification as filed and both the new and amended claims, do particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Further, the specification, as detailed above, clearly sets forth the metes and bounds of the patent protection desired, and the scope of the claims is ascertainable. Claims 3 and 4 depend from claims 1 and 2 and are likewise allowable. Similarly, new independent claims 7-8 and claims 9-10 that depend therefrom are also allowable for the same reasons stated above. Additionally, the addition of the language required to overcome the objection in the Office Action, see below, renders the rejection moot. Therefore, Applicant respectfully requests withdrawal of the rejection.

**Objections to the Specification**

The specification is objected to for the reasons stated on page 3 of the Office Action under 37 C.F.R. 1.75(d)(1) and MPEP § 608.01(o). In response Applicant has amended the specification to recite the exact phrase "the start capacitor for only that speed is selected to minimize amperage spikes when switching speeds." Support can be found on page 6, lines 3-20 of the originally filed application as shown above.

However, Applicant submits that the claimed limitation would have been obvious to one of ordinary skill in the art based on Applicant's originally submitted application. As shown above, the specification of the originally submitted application

contains the description of Applicant's invention, including the limitation of amended claims 1 and 2 and new claims 7-10. Additionally, it would be obvious one of ordinary skill in the art how to make and use Applicant's invention based upon the disclosure as originally provided and the claims as amended and new claims 7-10.

Further, one of ordinary skill in the art would not mistake Applicant's invention for Phillips or Shapess because they cover different subject matter. The Shapess reference is directed toward overcoming torque, a rotational force, of small electric motors to increase motor efficiency which has nothing to do with Applicant's invention of reducing amperage spikes. The Phillips reference is directed toward maintaining the phase displacement of the current between the windings of an electrical motor, which also has nothing in common with Applicant's invention. Neither Shapess or Phillips alone or in combination would teach or suggest to one of ordinary skill in the art the reduction of amperage spikes as claimed by Applicant.

Therefore, Applicant respectfully requests withdrawal of the objection.

**Rejections Under 35 U.S.C. § 103**

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's prior art of Figure 4 in view of Shapess (U.S. Patent No. 5,514,943) and Phillips et al. (U.S. Patent No. 4,453,118). Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's prior art of Figure 4 in view of Shapess, Phillips and Fisher et al. (U.S. Patent No. 6,121,746). Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lau (U.S. Patent No. 6,412,123) in view of Applicant's prior art of Figure 4, Shapess and

Phillips. In view of the amendments to the claims previously presented, Applicant respectfully traverses the rejections of claims 1-4 and restates the arguments previously presented in more detail to further exemplify the differences between Applicant's invention and the prior art presented. Further, Applicant has added new claims 7-10 to further define Applicant's invention over the prior art cited in the Office Action.

As previously presented, claims 1 and 2 of the application are now limited to embodiments wherein the start capacitor for each speed is selected to minimize amperage spikes when switching speeds. Additionally, new claims 7-10 are limited to electrical circuitry that is configured to eliminate large amperage spikes when switching the electrical motor from a lower speed to a higher speed.

Applicant submits that neither the admitted prior art, nor the cited references, either alone or in combination, make claims 1-4 as amended herein or new claims 7-10, obvious to those of ordinary skill in the art. Accordingly, Applicant respectfully requests that the rejections to claims 1-4 under 35 U.S.C. § 103 be withdrawn. Moreover, new claims 7-10 should not be limited by the prior art.

Additionally, the Office Action states on pages 4 and 5 that it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to employ a selected speed to minimize amperage or current spikes. Also, that such modification would be considered a mere choice of a preferred speed on the basis of its suitability for the intended use especially since it is known in the electronic speed control art that changes in speeds cause voltage/current spikes. And finally that it is not inventive to discover the optimum speed for an electronic control device by routine trials and errors.

Applicant submits that it would not have been obvious to one of ordinary skill in the art at the time the claimed invention was made for the reasons stated below. Additionally, the prior art cited alone or in combination does not allow for Applicant's invention to be made. Additionally, Applicant's invention is not dependent on a choice of a "preferred speed" as suggested in the Office Action. In fact Applicant's invention is not limited to a specific speed or a "preferred speed," nor is there any reference to an "optimum speed" as suggested by the Office Action. Applicant's invention is directed to operating at a plurality of discrete operating speeds. Finally, Applicant's submit that it is economically infeasible to randomly manufacture motors, windings and electronic controls by "routine trials and errors," and that the application of Applicant's invention using sound mathematical and engineering principles is inventive and not a random choice of materials.

**Applicant's Admitted Prior Art**

Applicant's admitted prior art, as illustrated in Figure 4 of the application, describes electrical circuitry of variable speed electrical motors of the prior art wherein there is only one start winding and only one start capacitor for the entirety of the motor. Applicant's prior art is the same as the prior art cited in the Shapess reference as noted in the Office Action on pages 3-4.

**United States Patent No. 4,453,118 to Phillips et al.**

As previously stated, Phillips, as noted in the Office Action, is directed toward maintaining the phase displacement of the current between the windings of an electrical motor. This is in contrast to the claimed invention, which is limited to the

decreasing of amperage spikes associated with the high voltage applied when switching between a plurality of distinctly selected speeds.

In column 4, lines 55-60 of Phillips, it is disclosed that capacitors can be used in series with the start windings to maintain the phase displacement of the currents between the windings. Thus, the capacitor selected to maintain the phase displacement of currents between the windings requires entirely different capacitors than capacitors that would be required in Applicant's invention to minimize amperage spikes because of the inherent differences between amperage spikes and phase displacement.

**United States Patent No. 5,514,943 to Shapess**

Shapess, as noted in the Office Action, discloses a single-phase, variable-speed motor constructed in a capacitor start configuration wherein the start circuit includes start windings connected in series with start capacitors in order to provide high torque during start conditions. Shapess discloses in column 1, lines 19-30 (emphasis added):

> ***Conventional single phase motors commonly have a multi-speed capability and frequently are constructed in a capacitor start or a capacitor start/capacitor run configuration. In capacitor start motors, start circuits are connected in parallel with the run winding of each speed of the multi-speed motor. The start circuits include start windings which are connected in series with start***

***capacitors***. During a motor start, both the run windings and the start windings are connected across the motor power source to magnetically excite the rotor and cause rotation thereof. ***The start winding and start capacitor combination is used to provide the high torque required during typical start conditions. However, the capacitance necessary to start the motor is typically too large for optimal motor efficiency***. Therefore, a switch is usually connected in series with the start capacitor which is used to disengage the start circuit when the motor has either reached a predetermined speed or after a predetermined time has elapsed. However, once the start circuit is disengaged the motor still does not operate at maximum efficiency.

**Analysis**

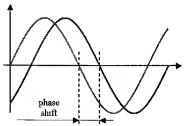
As noted above, amended claims 1-4 and new claims 7-10 in this application minimize amperage spikes when the electrical motor switches speeds, where amperage is the measured amount of electric current through a conductor.

**I. The Phillips Reference (US 4,453,118):**

Phillips is directed to "maintaining the phase displacement of the current between the windings of the motor." Thus, capacitors selected in Phillips to maintain current phase displacement would be unsuitable to counter amperage spikes in

the invention. Conversely, capacitors chosen in Phillips to counter amperage spikes would be unsuitable to maintain current phase displacement.

Applicant would like to point out the following facts. Phase displacement, as is claimed in Phillips, is a change of phase whereby an alternating current attains its maximum later or earlier. An inductance would cause a lag in phase and a capacitance would cause an advance in phase. The graph below is and illustration of phase shift. The horizontal axis represents an angle (phase) that is increasing with time.




A phase shift is described by the formula:

$x(t) = A\sin(2\pi ft + \theta)$ (equation 1); where **A** is the amplitude of oscillation, and **f** is the frequency and $\theta$ is the phase of the oscillation.

Phillips is directed toward minimizing $\theta$, the phase displacement along the horizontal of the above graph. Phillips neither teaches nor suggests minimizing amperage spikes, the vertical axis of the above graph, as claimed by Applicant. Finally, the capacitance chosen by applying Phillips to reduce the phase angle would not affect amperage spikes as claimed by Applicant.

**II. The Shapess Reference (US 5,514,943):**

Shapess is directed toward maintaining high torque during start conditions. Applicant draws attention to the following facts. Torque can be defined as the rate of change of angular momentum. Electric motors tend to produce maximum torque close to zero rpm, with the torque diminishing as rotational speed rises. The following equation exemplifies this discussion:

$$Power = torque \times angular\ speed$$

where Power is the mechanical work per unit of time, and where angular speed ω is in revolutions per unit of time shown in the following equation:

$$\omega = \frac{2\pi}{T} = 2\pi f$$

The Shapess reference cited in the Office Action specifically designed the device to overcome torque. As stated in Shapess, column 1, lines 6-10 and lines 19-36 (emphasis added):

> "This invention relates generally to motor control systems and ***specifically to motor control systems for providing adequate starting torque and facilitating motor efficiency especially in low speed.***"
>
> ...
>
> "In capacitor start/capacitor run motors, run capacitors are used in addition to the start circuits for each speed of the multi-speed motor. The run capacitors are connected in series with a secondary windings and both are connected in parallel with the run windings

for each speed of the multi-speed motor. The motor windings and the run capacitors in this configuration are tuned to run at optimal efficiency as is know in the art. Thus, when the start circuits are disengaged, the motor can be designed to run at optimal efficiency. ***However, this configuration requires additional complexity, costs, and potential for failure of such motors.*** However, ***the capacitance necessary to start the motor is typically too large for optimal motor efficiency. Therefore, a switch is usually connected in series with the start capacitor which is used to disengage the start circuit when the motor has either reached a predetermined speed or after a predetermined time has elapsed.*** However, once the start circuit is disengaged the motor still does not operate at maximum efficiency.

Referring back to equation 1 above: $x(t) = A\sin(2\pi ft + \theta)$, it is clear that Shapess is directed toward maximizing the angular speed, $\omega$ or $2\pi f$, of the equation for "providing adequate starting torque and facilitating motor efficiency especially in low speed." This is in contrast to the claimed invention, which is minimizes amperage spikes associated with the high voltage applied when switching between a plurality of distinctly selected speeds.

Additionally, Shapess makes note of the same prior art that Applicant also discloses in Figure 4 of the originally filed application. The Shapess reference to the prior art is clearly different from Applicant's invention shown in Figure 3 of the originally filed application.

Finally, the Shapess reference specifically teaches away from the prior art. As noted above: "In capacitor start/capacitor run motors...this configuration requires additional complexity, costs, and potential for failure of such motors." Therefore, the Shapess reference acknowledges the prior art, as does Applicant's disclosure, but teaches an entirely different concept unrelated to either Applicant's invention or the Phillips reference.

Thus, there is nothing in Shapess or Phillips which would suggest or give incentive to those of ordinary skill in the art to combine either Shapess, Phillips or Applicant's admitted prior art to yield the present invention.

Moreover, combining the high torque start winding capacitance of Shapess with the current phase displacement capacitance of Phillips would be readily recognized by those of ordinary skill in the art to <u>not</u> provide the minimization of amperage spikes as described and claimed by Applicant. Further, there is no motivation to combine the minimalization of phase angles between motor windings as claimed in Phillips with the maximization of torque as disclosed in Shapess to make Applicant's invention. Additionally, neither reference makes any mention of amperage spikes or how the reference could be modified to prevent amperage spikes. Finally, the combination of Phillips and Shapes, could not produce Applicant's invention as the

capacitance chosen by applying Phillips to reduce the phase angle, along with the capacitance chosen to increase the amount of torque at low speeds would not specifically affect amperage spikes as claimed by Applicant. In fact, the capacitance chosen in a combination of Phillips and Shapess could negate the effect of both claimed inventions rendering the resulting motor unfit for either application.

Claims 3 and 4 depend from claims 1 and 2 and, therefore, are also allowable. Moreover, new claims 7-10 should not be limited by the cited references for the same reasons and therefore are also allowable.

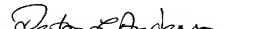
Therefore, the attempt by the United States Patent and Trademark Office to show that claims 1-4 would have been obvious to those of ordinary skill in the art at the time the claimed invention was made is in error, and the rejection of claims 1-4 under 35 U.S.C. § 103 should be withdrawn. Moreover, new claims 7-10 are also allowable over the cited prior art for the reasons stated above and should be granted in view of the arguments made above.

**CONCLUSION**

For the reasons set forth above, Applicant respectfully submits that all of the claims remaining in the application are now in condition for allowance. Accordingly, reconsideration, reexamination and allowance of all claims is requested.

Respectfully submitted,

Date: January 22, 2008

By: 
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